HOW TO MEASURE AND IDENTIFY THE ULTIMATE IMPROVEMENT REQUIRED FOR CUSTOMER SATISFACTION

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ABSTRACT

In current hypercompetitive markets, customer satisfaction is one of major requirements that enable the company to generate some benefits to their business. This is also including the relationship with the customers as a good foundation for the creation of loyalty and repeat purchase of customers. However, the customer requirements are much more technically complex than in consumer market, especially in service sector. On the other hand, the analysis of importance and performance assumed on Kano method to measure customer satisfaction also lead to misleading the implications of customer satisfaction since some scholars use this technique into symmetric and linear relationships between attribute level performances. In this study, we poposes the approach on how to find the priority improvement or the most significant element required for improvement based on Kano method as a measurement basis ; using Kano manipulating graph, ranking level, and then a simplification approach toward the graphs to enable the priorities / significant element required for improvement determined and justified. To justify the approach proposed, some trials carried out in service companies as the case of study.

Keywords: *Customer satisfaction, Kano method, Kano manipulating Graph, priorities for improvement required.*

1.0 INTRODUCTION

In current hypercompetitive markets, the companies' survival in the market and, thus becoming successful in their business field are depends on many factors contributed. Since the main objective of a business is, basically, to create profit by satisfying the customers, according to Schnaars (1991), through the creation of customer satisfaction will enable the company to generate some benefits to them, including the relationship with the customers as a good foundation for the creation of loyalty and repeat purchase of customers. On this perspective, Rahman (2004:426) stated the customer satisfaction constitutes as a cardinal indicator. By considering on this point of view, customer relationship development and management systems are, therefore, need to be focused heavily by companies (Verhoef *et al.*, 2002), while the development of effective customer relationships need to be recognized as an essential component of marketing strategies (Lymperopoulos *et al.*, 2006:366). Toward this idea where service quality as becoming a primary competitive weapon, then the quality of services is globally remained as a critical point for businesses strategy to a comparative advantage in the marketplace (Hossain & Leo, 2009:338; Stafford, 1996:6)

The facts, what the companies faced to the challenges and competitions in the market are not only on how to identify what the customer satisfaction and requirements. This is due to the actual manifestation of the state of satisfaction is vary from person to person, also against products or services. In addition, the customer satisfaction is an ambiguous and abstract concept (Kanojia and Yadav, 2012). Whether they have been or might be successfully implementing or not, according to Kultanan *et al.*, (2006), the customer requirements are much more technically complex than in consumer market, especially in service sector. In product quality measurement, even they are still in scientific debate on superiority of one method over another. This is due to the methods used are usually not treated as complementary, rather as alternative tools (Zelma, 2008). Hence, as previously was underlined by Grigoroudis *et al.*, (2002:1), a number of measurable parameters that directly linked to several aspects of company's products/services or elsewhere remained as an abstract and intangible notion. In addition, there are a common problems occurred while analyzing data from customer satisfaction surveys which is carried out by comparing the stated and derived importance for a set of satisfaction dimension (Grigoroudis and Spyridaki , 2003:229; Kano *et al.*, 1984). Therefore,

(i) First, the companies need to always taken their business strategy into account in providing goods and services to satisfy the customers by interpreting today's competitive market as a crucial effort in creating a loyal customer, which involves of capturing and retaining them. In this perspective,

when customers are satisfied, they are more likely to return. While they are dissatisfied, however, the customers are more likely to go elsewhere. Gerson (2003) stated the understandings of customer's expectation depend on the fulfilment of customer's need and the existence of the product or services performance delivered to them. Besides the quality and price factors, since the retention of very loyal customer is a key to organizational survival, the others importance factor that should be therefore considered by them is also how to attract the customer to buy the product (Jones & Sasser, 1995). Hence, it can be concluded that a major outcome of marketing activities are not only related to how much profit can be achieved, but also on how high customer satisfaction resulting from company's activities. This can be experienced in a variety of situations and connected to both goods and services (CSSP,2007:6 ; Cengiz, 2010:78).

(ii)   Second, Tse and Wilton (1988) argues that the customer response should be considered to the mismatches (disconfirmation) perceived between prior expectations and actual performance of a product. A comparison of the perceived performance against the expectations is as a level of customer feelings (Kotler, 2003) where the expectation, as asserted by Hsu and Cai (2009:5), is as a critical antecedent of satisfaction that becomes a determinant of attitude. The customer satisfaction has related to an emotional challenge of the experience towards the consumption of a product / service, the purchase evaluation, according to Wilkie (1990), is therefore required against the customer's expectations and dissatisfaction of the selected alternatives. Especially, when the expectations results (outcome) were not met (Engel, 1990). Hence, due to the customer satisfaction is greatly affected by customer expectations (CSSP, 2007:6), how customers, according to Grönroos (1998:329), perceived good the product quality they should be based on the measurement against what the approaches of attitude determinant of customer satisfaction related to the service perceptions and expectations value. To address this issue, scholars discussed about as follows:

(a)   the process of creating and delivering the value to customers in the marketplace as the combination of customer satisfaction and price (Collier, 1995).

(b)   how to create the service values with the aim of satisfying customer where the company must to correctly attribute the factors related of the identified quality so that correct decision can be made (Chen and Lee, 2007).

(c)   the assumption that a customer will learn from experience, where the decreasing levels of expectations disconfirmation against goods and services should affect customer satisfaction (McQuitty et al., 2000).

(d)   the using of satisfaction ratings as the performance indicator of products and services delivered, beside the indicator of the company's future (Matzler and Hinterhuber, 1988).

(iii)   Third, according to Kumar et al., (2008:176-177), they are, however, not clearly to differentiate the service quality constructed; distinguishing between functional service quality (FSQ) which means doing things nicely and technical service quality (TSQ) is as doing things right. Specifically in service business, most of the case discussed the service perceptions and expectations. (i.e. bank (Alhemoud, 2010; Naeem & Saif 2010; Guo et al., 2008; Jabnoun & Al-Tamimi, 2002), financial and loan funding (Gottschalk, 2008), hospital (Brennan, 1995; Williams et al., 1998; Peltola et al., 2007; Padma et al., 2009), public service (Rodríguez et al., 2009), security firm (Xu and Goedegebuure, 2005), airlines (Gustafsson et al., 1999; Frost and Kumar, 2001), education (Joseph et al., 2005; García-Aracil, 2009), etc.). In order to increase the company's competitiveness, therefore the companies should pay greater attention to customer service quality and customer satisfaction through the deregulation of the total perception related to the quality of a service as the outcome (technical quality), rather than simply addressing service quality from a functional perspective (Grönroos, 1998:329; Kumar et al., 2008:183; Kang and James, 2004:266). Steve et al. (2001) in their research added that in satisfying the customers are also greatly depends on a smooth running process approach to successfully completing a customer transaction. Briefly to say, there is a positive linear relationship between staff satisfaction, service quality and customer satisfaction leading to profitability (Hallowell et al., 1996; Yee et al., 2009).

Based on problems aforementioned, each of scholars proposed the approaches how to measure the customer satisfaction. (i.e. IPA to improve order-winner criteria and win order (Lee et al., 2009), IPA with strength and weakness (Zemla, 2008), IPA with Kano Model and Dematel (Hu et al., 2009), MUSA method (Grigoroudis and Spyridaki, 2003), structuring the customer requirement model with Quality Function Deployment (Kultanan et al., 2006; Matzler and Hinterhuber, 1998; Lai et al., 2004), the weighted average score model toward Kano model (Bhattacharyya and Rahman, 2004; Xu et al., 2009), customer satisfaction through creating loyal customers (Rahman, 2004), the influences the components of products and services (Sauerwin et al., 1996; Sauerwein, 1999), the importance of quality attributes using 8 categories of Kano model (Yang, 2005),

potential benefit acquired with quality elements classified into 3 categories of Kano models (Hsu *et al.*, 2007), interactivity-satisfaction relationship (Zhao and Dholakia, 2009), integrated approach of Kano model and ANOVA technique (Lai and Wu, 2011), SERVPEX (Robledo, 2001), integrative configuration of customer value by 3-angle view (Khlaifa, 2004), to convert of attractive quality attribute to must-be quality attribute and one-dimensional quality attribute (Lee *et al.*, 2009), integration of FMEA and Kano model (Shahin, 2003), integrating the Kano model, AHP, and planning matrix (Bayraktağlu and Özgen, 2007), the multistage method for weighting customer satisfaction (Crostack *et al.*, 2010), Brady and Cronin's model toward Kano Model (Högstrom *et al.*, 2010), better-worse diagram of Kano model (Witell and Löfgren, 2007), the dynamic of service attributes of attractive quality in Kano model (Witell and Fundin, 2005), integration of Kano model and exit-voice theory (Lee *et al.*, 2009), life cycle design (Ernzer and Kopp, 2003; etc). They are, as commented by Tontini and Silveira (2007:497), however not directly discuss the aspects of performance-importance inferred to the priorities of improvement from the attributes' positioning (based on current level performance) related to the different of Kano quality elements resulted (in which improvement priorities can be inferred by analyzing the current level of performance). In this sense, as was underlined by Mikulić (2007), they would potentially lead to misleading the implications of customer satisfaction. Especially, toward the analysis of importance and performance assumed as the technique of symmetric and linear relationships between attribute level performance and OSC (asymmetric impact on overall customer satisfaction). Therefore, since the major assumptions of the Kano model is, actually, pointing out on the phenomenon of product/service attributes that can be inferred by the current level of performance - that showing as an asymmetric and nonlinear impact to the certain product/service attributes (quality elements) - a further step in identifying the Kano quality elements that primarily have an impact on creating satisfaction through the improvement priorities finding, according to Sihombing *et al.*, (2012), is therefore required.

2.0 LITERATURE REVIEW

The "Voice of the Customer" (VOC) is a process used to capture the requirements or feedback from the customer in order to provide best-in-class service or product quality. The using of VOC is to describe the stated and unstated needs or requirements of the customer in a variety of ways such as direct discussion or interviews, surveys, focus groups, customer specifications, observation, warranty data, field reports, and complaint logs.

2.1 Kano Method

The Kano model offers some insight into the product attributes perceived to be important to customers. Kano's model employed is as a starting point of the proposed quantitative analysis that involves the conducting of preliminary study, developing, and administrating the Kano questionnaire. In this method, the most frequent observations of the sample set of responses are considered as the final Kano category for CR (customer requirements) (Kano *et al.*, 1984), where;

(i) Quantitative analysis of customer satisfaction into Kano's model is carried out by calculating two values which are "better" and "worse" in order to reflect the average impact of a CR on customer satisfaction (CS) or dissatisfaction (DS) of all customers (Berger *et al.*, 1993) as follows:

(a) Coefficient of cause of satisfaction (CS):

$$\frac{O + A}{M + O + A + I} \tag{1}$$

(b) Coefficient of cause of dissatisfaction (DS):

$$\frac{O + M}{M + O + A + I} \tag{2}$$

(ii) In making decisions about product developments, the features that have to be taken into consideration for improvement are the features that has the greatest influence on the perceived product quality (Sauerwein *et al.*, 1996; 1999), where their evaluation rule as follows :

$$M > O > A > I \tag{3}$$

In this formula, M stands for 'Must-be' requirements, O for 'One-dimensional' requirements, A for 'Attractive' requirement and I stands for 'Indifferent' requirements. It means that the

range of 'Must-be' attribute have the largest range and it is large than the other attribute. This evaluation rule recommends the first taking those product requirements into consideration, which are allocated to the requirement Kano's method category M because disregarding of such elementary basic elements creates dissatisfaction (Zanger and Baier , 1999). The 'Indifferent' attribute has the least acuteness because it has only minor influence on the employee's satisfaction. If this attribute did not being fulfill, the employees will does not feel dissatisfy. Table 1 shows the six categories quality attributes influenced to the customer satisfaction.

Table 1: Kano's evaluation table

FUNCTIONAL	DYSFUNCTIONAL				
	1. Like	2. Must-be	3. Neutral	4. Live with	5. Dislike
1. Like	Q	A	A	A	O
2. Must-be	R	I	I	I	M
3. Neutral	R	I	I	I	M
4. Live with	R	I	I	I	M
5. Dislike	R	R	R	R	Q

A = Attractive ; M = Must- be; R = Reverse;   O = One- dimensional ;
I = Indifferent; Q = Questionable

(a)   Must-be Requirements (Threshold/Basic attributes). If these requirements are not fulfilled, the customer will be extremely dissatisfied. The must-be requirements are basic criteria of a product. Fulfilling the must-be requirements will only lead to a state of "not dissatisfied". Must-be requirements are in any case a decisive competitive factor, and if they are not fulfilled, the customer will not be interested in the product at all.

(b)   One-dimensional Requirements (Performance/Linear). With regard to these requirements, customer satisfaction is proportional to the level of fulfilment – the higher the level of fulfilment, the higher the customer's satisfaction and vice versa. One-dimensional requirements are usually explicitly demanded by the customer.

(c)   Attractive Requirements (Exciters/Delighters). These requirements are the product criteria which have the greatest influence on how satisfied a customer will be with a given product. Attractive requirements are neither explicitly expressed nor expected by the customer. Fulfilling these requirements leads to more than proportional satisfaction. If they are not met, however, there is no feeling of dissatisfaction.

(d)   Indifferent Attributes. The customer does not care about this feature. Means that the customer is not concerned with this product attribute and is not very interested whether it is present or not.

(e)   Questionable Attributes. It is unclear whether the customer expects this attribute. This situation occurs if there is a contradiction in the customers' answers to the paired questions. A questionable rating indicates incorrectly phrased question, misunderstanding of a question, or an incorrect response.

(f)   Reverse Attributes: Means that some of the respondents' satisfaction decreases with the existence of this requirement, but they also expect the reverse of it.

(iii)   Category Strength (CA) Value. This category strength (CAT) method is a suitable method in determining the priorities within a requirements category. From the value of CAT, it is also can be ranking in order to known which category have to be focus first. Usually, the maximum value of CAT is placed at the first place which means it has the priority to be focus among the other requirement. Besides, the lower the percentage of the CAT value means that the requirement that being provided are satisfy the customer or employee feeling. The CAT index can be calculated using the CAT formula as follow:

CAT = 1st most frequently-given nomination (%) – 2nd most frequently nomination (%)   (4)

(iv)   Category Fuzzy Kano. Lee and Huang (2009:4479 and 4481) said that traditional Kano questionnaire (TKQ) unable to sufficiently reflect the complex thought of an individual since Kano's model are always lack of considering the fuzzy and uncertainty of mentality and affection when devising questionnaire. In addition, in Kano's traditional evaluation sheet, all quality attribute strengths are unequal; it is unreasonable and not precise to sum up

equivalently each response frequency of every quality attribute to evaluate the influences of quality attributes (Lee *et al.*, 2011:180). Therefore, simply using a mode statistic as the classification criterion is not appropriate. It is necessary to adopt a 'continuous' approach for Kano's model to quantitatively analyse the average impact of a CR on the overall customer satisfaction (OCS) (Wu and Wang, 2012:536). To overcome these difficulties, according to Mikulic´ and Darko Prebežac (2011:50), it should be recognised that the key issue that determines the Kano category of an attribute is not the performance of that attribute; rather, it is actually the provision (or non-provision) of a more-or-less expected benefit. On this, to further increase the reliability of attribute categorisations, Kano's method should refer to the provision (or non-provision) of the benefits to be expected through the provision of an attribute rather than the provision of the attribute itself.

(a)   Fuzzy Kano Questionnaire (Lee and Huang, 2009:4481)

Table 2: Fuzzy Kano's evaluation table

	Fuzzy Kano Questionnaire				
	Like	**Must-Be**	**Neutral**	**Live - With**	**Dislike**
Functional	20%	50%	30%	-	-
Dysfunctional	-	-	-	50%	50%

(b)   Matrix calculation to compare and evaluate "need profiles" based on functional and dysfunctional. On this, FI (functional score: satisfaction degree assessing the existence of the ∑need or sufficiency), DI (dysfunctional score: dissatisfaction degree assessing the inexistence of the need or insufficiency), and RI (dissatisfaction degree related to existence and measuring a reverse index) (Rejeb *et al.*, 2008).

Table 3: Revision of Kano's evaluation table

FUNCTIONAL			DYSFUNCTIONAL				
			1. Like	**2. Must-be**	**3. Neutral**	**4. Live with**	**5. Dislike**
			+2	+1	0	-1	-2
	1. Like	+2					
	2. Must-be	+1					
	3. Neutral	0					
	4. Live with	-1					
	5. Dislike	-2					
A = Attractive ; M = Must- be; R = Reverse; O = One- dimensional ; I = Indifferent; Q = Questionable							

$$FI = [\Sigma \text{ Degree of satisfaction with existence / Number of response X 2}]$$
$$\text{(only the} \geq 0 \text{ at the functional questions)} \qquad (5)$$

$$DI = [\Sigma \text{ Degree of dissatisfaction with inexistence / Number of response X 2}]$$
$$\text{(only the} \geq 0 \text{ at the functional questions)} \qquad (6)$$

$$RI = [\Sigma \text{ Degree of dissatisfaction with existence / Number of response X 2}]$$
$$\text{(only the} \geq 0 \text{ at the functional questions)} \qquad (7)$$

(v)   Kano Manipulating Graph. Since in the ranking system based on pairwise value, it can be assumed that the functional value is reverse of dysfunctional value and vice versa (Sihombing *et al.*, (2012a,b) as follows:

$F = \sim DF$ or $DF = \sim F$
$\Leftrightarrow F = DF'$ or $DF = F'$

The ranking value based on this approach is as comparison between F vs. DF and DF' vs. F. This approach also can be constructed into the graph as for consideration taken for improvement required. Based on this reason, the modification is carried out toward equation (5) and equation (6) where SSI is sum of satisfaction existence and DDI is dissatisfaction existence. Below is the formula of how to determine the ranking values:

$$K=Ln\left[\frac{\frac{(F \times DF')^2 + (DF \times F')^2}{(F+F')} + \frac{(F \times DF')^2 + (DF \times F')^2}{(DF+DF')}}{2}\right]$$

(8)

3.0 METHODOLOGY

This study is carried out on how to find out the customer satisfaction position and the priorities improvement required. The data and information related to their satisfaction performance is categorized into the important level based on ranking level. The ranking level used is to generate the importance level to meet the customer needs, while Kano model is to determine what the factors that satisfy the customer.
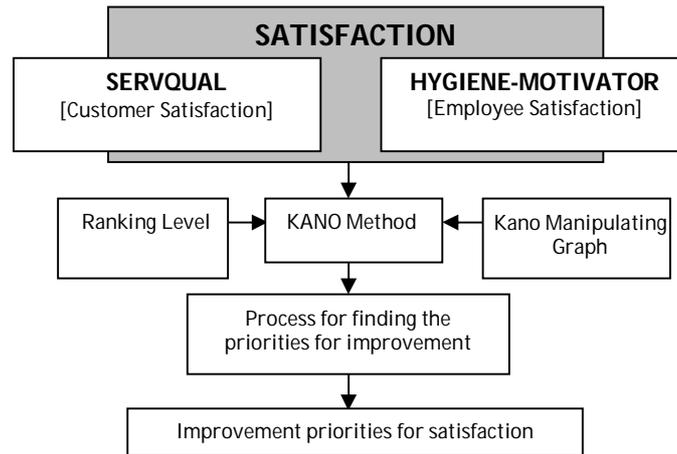
Figure 1: Flow to find the priorities improvements using Kano

Figure 1 shows the framework to find the improvement priorities based on the questionnaire developed refers to Parasuraman's Servqual dimension (Parasuraman *et al.,* 1988) and Herzberg's Hygiene-Motivator factors (Herzberg *et al.,* 1959) using Kano method. Each element of Servqual related to service quality attributes and Herzberg theory related to Hygiene – Motivator factors are generated into Kano pairwise of questions formulated. The first question concerns to the reaction of the customer related to functional form (F) of the question, while for the second question concerns to the reaction of dysfunctional form (DF) of the question.

4.0 RESULT AND DISCUSSION

Based on 5 cases taken (Table 4) against the survey questionnaire generated with quality attributes criteria refers to Kano model as shown in Table 5a~5e are as following:

(i) There are many of "Must-be" attributes present in the cases of Event Organizer and Courier Service.
(ii) Only one (1) quality attributes with "Must-be" criteria existed in case of Hospital service.
(iii) In cases of Hotel and Bank service shows that many of "Indifferent" and "One-Dimensional" quality attributes existed

Table 4: Case Study of Service Company

No	External Customer Satisfaction	Samples
1	Bank	60
2	Event Organizer	30
3	Courier Service	138
4	Hospital	56
5	Hotel	145

To address such cases of how to find the improvement priorities, the approach of Saurwein *et al.,* (1996, 1999) using M>O>A>I face the difficulties since the response data of survey presence with the similar quality attributes. While to find the priorities using others Kano method (part 2b~2e) for the improvement required by each of the companies services are in ambiguity since each of cases shows the different ranking values of the methods used. This means that the method proposed in part 2a ~ 2e to process the data for finding the

priorities improvement required by the service company is in contradiction since they are not consistent to each other. Therefore, to find the priorities for improvement elements of service required are as follows:

(i) First, determine which of response against the aspects/ elements generated in the questionnaires resulting with quality attributes based on Sauerwein approach (M>O>A>I). (See the yellow marks in the Table 5a~5e).

(ii) Second, compare each the elements of the previous quality attributes based on ranking level using Kano method in part 2. Point to note, if such elements having same of the higher ranking (the ranking level is 1), this can be determined as the top priorities for improvement required. However, if the ranking against the element is different, then find which of the elements having more top ranking.

(iii) Third, to justify which of the elements required for improvement priorities, then as follows:

(a) Compare the elements based on quadrant position of the graph (called Kano Manipulating Graph) as follows:

Method	F vs. DF	DF' vs. F'	SSI vs. DDI	Cs vs. DS	K	CAT	FI vs. DI
Quadrant	2	2 & 4	4	2 & 4	4	4	1 & 3

(b) Find which of the elements having most frequently presented in the quadrant mentioned above (Table 7).

(c) Compare the most frequently elements existed with the most of higher ranking (Table 5a~5e). In table 6 shows that the result of the improvement priorities required is in green marks.

4.1   Cases (Based on Table 4)

(i) Only 1 "Must-be" quality attributes existed. Table 5a shows the feeling of customer requires the service with only 1 of "Must-be" quality attributes existed (see a case of the Hospital service). The ranking level using F vs. DF; CS vs. DS; FI vs. DI (RI) and K is no.1 as the higher priority. In this case, Sauerwein approach using M>O>A>I (Sauerwein *et al.,* 1996; 1999) and Fuzzy Kano as proposed by Lee and Huang (2009) is consistent.

(ii) Many of "Must-be" quality attributes existed. The customer requires the service with more of "Must-be" quality attributes existed are as following:

(a) In case of the Event Organizer (Table 5b), there are "Must-be" quality attributes on K1, K2, K13, K14, K15, K16, and K29. However, based on ranking levels show that only K1 and K15 which having more of the top ranking level. Using F vs. DF; SSI vs. DDI; CS vs. DS; FI vs. DI (RI) ; K and CAT, the ranking level of K15 is no.3, 2,2,1,3, and 16 , while the ranking level of K1 is No. 4,1,1,4,4, and 1 respectively. Since both of these elements having more of the top ranking level, the justification in determining which one of these elements are as the most priorities using quadrant position of Kano Manipulating Graph as mentioned previously. Table 6 shows that K15 is the top priority since this element is frequently existed in the certain quadrant prerequisite of graph. (K15 frequently in 6 times, while K1 only in 4 times)

(b) In case of the Courier Service (Table 5c) , there are "Must-be" quality attributes on K3, K6, K7, K8, K9, K10, K11, K12, K13, K15, K18, K19, K20, K24, AND K25. Among of these elements which having the higher ranking is K3, K7, K8, K11, K13, and K20. Based on the quadrant position of graph, we can justify that the most priorities among these elements is on K8. This element frequently found in 7 times.

(b) There is no "Must-be" quality attributes existed, only "Indifferent" and "One-Dimensional" attributes.

(i) Table 5d shows the customer requires the service with more of "One Dimensional" quality attributes existed (case of the Bank service), that is K1, K2, K5, K6, K8, and K9. However, based on ranking levels only K5 and K6 which having more of the top ranking level. Using SSI vs. DDI; CS vs. DS; FI vs. DI (RI) ; K and CAT, the ranking level of K5 is no.1, 1, 6, 1, and 1, while the ranking level of K6 is No. 2, 3, 1, 2, and 5 respectively. Based on quadrant position of Kano Manipulating Graph, we found that K5 is the top priority since this element frequently existed in 4 times and having the most of top ranking level).

(b)   In case of the Hotel Service (Table 5e), there is "Indifferent" quality attributes existed on all the elements of service generated in the questionnaires. However, only one element which having the higher ranking, that is K8. (The ranking level of F vs. DF; CS vs. DS, and K is no. 1, 2, and 1). Based on the quadrant position of graph, this element (K8) also having frequently occurred, that is 6 times. Therefore, K8 is as the top priority for improvement required by the company.

4.2 Trials (Based on Table 4)

Using the method discussed above, the trials carried out are against employees' satisfaction of Hotel Service (Table 6a) and customer satisfaction of Pos Service (Table 6b) as below:

(i)   In the case of employees' satisfaction measurement using Herzberg related to hygiene and motivator factors, 150 survey respondents articulate their feeling more on elements K12 and K20 that having "One-dimensional" quality attributes. These elements are also having more of the top ranking levels. This is consistent with Sauerwein approach using M>O>A>I since there are no "Must-be' quality attributes existed. Both of these elements are having same frequently occurrence in the quadrant of graph method with the quality attributes stated about the satisfaction. The priorities improvement required in this case is on how they are existed in the factors of Herzberg's motivators. This is due to fulfil the motivators factors will determine how satisfy the employees after the hygiene factors had already fulfilled.

(ii)   In the POS service case, 180 respondents answer the survey where more of "Must-be" quality attributes existed (K3, K6, K8, K9, K17, K18, K19, K20, K22, and K25). Based on ranking level, element K17 having more of the top ranking level. Using F vs. DF ; SSI vs. DDI; CS vs. DS; FI vs. DI (RI) ; K and CAT, the ranking level of K17 is no.1, 2, 3, 1, 1, and 4 respectively. While based on quadrant position of Kano Manipulating Graph, although K9 found is more frequently than K7 (7 versus 6 times), element K7 is, however, having the most of top ranking level. Therefore, the decision for priority improvement required is on element K7.

5.0 CONCLUSION

To determine the top or first priorities for improvement required by the company through Kano method is not always easy to answer, especially if they presence with many of the same quality attributes. Based on cases discussed, Sauerwein approach using M>O>A>I to decide the importance based on Kano method and Berger approach through CS vs. DS graph or CS-DS for ranking level faced the ambiguity to justify which the element required for first improvement priority. The others method, such as Fuzzy Kano, Tontini approach through CAT, and Rejeb proposal are actually also make the justification for finding the priority for improvement required becoming more confusing. Considering on this reason, the Kano manipulating graph proposed through DF' vs. F' against F vs. DF   as well as K ranking to enrich the picture of customer expectation through Kano method are actually enable us to find what the priority required for improvement since it can extent the pictures of customer need based on data collected.

In this point of view, to find the most important for improvement priorities, Sauerwein approach toward ranking levels and the graphs need a simplification of data observation. First, the simplification toward the graphs as proposed in part 4c that concentrate on certain quadrant of the graphs. Second, the simplification toward the ranking level by only considering the most of top ranking level from the methods proposed in part 2. Based on both simplifications, we can justify and choose which of the most priority element for improvement taken as having proven in trial cases.

In this study, since the approach to determine customer requirements by extending the Kano method need more calculation carried out and then both simplification should be done to process the justification for priority improvement required, further study on how determine the priority for improvement with simply approach based on Kano method are however required.

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Table 5a: Customer Satisfaction: Case of Hospital Service

CASE: HOSPITAL- CUSTOMER SATISFACTION

No	F vs. DF	SSI vs. DDI	CS vs. DS	RI	K	CAT	F	DF	DF'	F'	SSI	DDI	CS	DS	FI	DI	K		MAX-1	MAX-2	TRADITIONAL	FUZZY
K1	8	20	9	8	7	15	2.07	3.48	2.52	3.93	0.52	-0.39	0.27	0.33	0.70	0.07	4.12	2.55	0.48	0.16	I	I
K2	9	19	26	15	9	4	1.91	3.21	2.79	4.09	0.62	-0.23	0.47	0.06	0.72	0.10	3.93	2.53	0.45	0.38	I	A
K3	2	25	14	3	2	3	1.88	3.93	2.07	4.13	0.62	-0.56	0.48	0.46	0.68	0.08	5.09	2.49	0.29	0.23	I	I
K4	7	21	27	9	8	5	1.70	3.18	2.82	4.30	0.69	-0.32	0.61	0.20	0.68	0.05	4.09	2.47	0.38	0.29	A	R
K5	16	18	24	24	26	8	1.86	2.77	3.23	4.14	0.64	-0.21	0.49	0.23	0.68	0.12	3.43	2.53	0.36	0.23	I	R
K6	27	6	16	23	22	6	2.91	2.39	3.61	3.09	0.27	-0.19	0.18	0.12	0.37	0.30	2.75	3.26	0.43	0.32	I	R
K7	3	24	6	5	4	10	1.89	3.86	2.14	4.11	0.61	-0.56	0.45	0.55	0.70	0.07	4.93	2.50	0.38	0.13	O	O
K8	24	3	11	17	25	23	3.20	3.32	2.68	2.80	0.15	-0.24	0.02	0.07	0.27	0.28	3.04	2.92	0.71	0.13	I	I
K9	23	9	2	9	24	16	3.16	3.52	2.48	2.84	0.15	-0.40	0.05	0.26	0.25	0.27	3.16	2.81	0.52	0.20	I	R
K10	25	1	7	27	23	25	2.89	2.79	3.21	3.11	0.16	-0.12	0.00	0.08	0.30	0.18	2.94	3.05	0.79	0.14	I	I
K11	26	2	15	17	21	11	3.45	2.96	3.04	2.55	0.16	-0.22	0.06	0.03	0.27	0.48	2.78	3.27	0.55	0.30	I	R
K12	6	22	22	9	6	2	1.77	3.34	2.66	4.23	0.66	-0.37	0.46	0.28	0.77	0.07	4.25	2.49	0.34	0.30	I	R
K13	13	17	17	14	14	13	2.32	3.30	2.70	3.68	0.44	-0.37	0.29	0.22	0.53	0.17	3.67	2.64	0.48	0.20	I	R
K14	1	27	1	1	1	9	2.00	4.14	1.86	4.00	0.53	-0.68	0.31	0.69	0.65	0.03	5.26	2.49	0.39	0.23	M	M
K15	12	13	4	12	12	20	2.41	3.45	2.55	3.59	0.32	-0.36	0.08	0.26	0.53	0.05	3.73	2.63	0.66	0.16	I	I
K16	22	4	18	20	20	27	2.73	3.14	2.86	3.27	0.26	-0.13	0.15	0.07	0.35	0.20	3.23	2.82	0.79	0.11	I	I
K17	20	5	20	17	17	24	2.68	3.27	2.73	3.32	0.24	-0.19	0.17	0.07	0.30	0.13	3.36	2.76	0.75	0.14	I	I
K18	19	7	19	18	18	22	2.50	3.13	2.88	3.50	0.29	-0.19	0.17	0.09	0.38	0.05	3.37	2.74	0.73	0.14	I	I
K19	17	8	13	16	16	26	2.46	3.23	2.77	3.54	0.29	-0.22	0.11	0.11	0.45	0.03	3.49	2.70	0.75	0.11	I	I
K20	5	23	23	5	5	1	1.80	3.68	2.32	4.20	0.67	-0.44	0.54	0.30	0.75	0.12	4.76	2.49	0.36	0.32	I	A
K21	18	14	25	27	27	12	1.95	2.57	3.43	4.05	0.56	-0.14	0.37	0.09	0.68	0.05	3.18	2.58	0.48	0.21	I	R
K22	21	10	21	19	19	18	2.52	3.05	2.95	3.48	0.38	-0.21	0.23	0.13	0.47	0.18	3.30	2.76	0.59	0.16	I	R
K23	10	16	3	10	10	14	2.64	3.82	2.18	3.36	0.31	-0.46	0.12	0.31	0.47	0.20	3.86	2.59	0.57	0.25	I	I
K24	14	12	8	13	13	21	2.50	3.46	2.54	3.50	0.29	-0.32	0.13	0.20	0.42	0.07	3.67	2.65	0.68	0.16	I	I
K25	15	11	10	15	15	19	2.50	3.45	2.55	3.50	0.30	-0.30	0.16	0.22	0.42	0.08	3.65	2.66	0.66	0.16	I	I
K26	11	15	12	11	11	17	2.34	3.39	2.61	3.66	0.39	-0.32	0.25	0.25	0.50	0.10	3.74	2.63	0.55	0.16	I	I
K27	4	26	5	3	3	7	1.93	3.89	2.11	4.07	0.58	-0.60	0.35	0.53	0.73	0.07	4.93	2.50	0.38	0.27	I	O

Table 5b: Customer Satisfaction: Case of Event Organizer Service

CASE: EVENT ORGANIZER- CUSTOMER SATISFACTION

No	F vs. DF	SSI vs. DDI	CS vs. DS	RI	K	CAT	F	DF	DF'	F'	SSI	DDI	CS	DS	FI	DI	K		MAX-1	MAX-2	TRADITIONAL	FUZZY
K1	4	1	1	4	4	1	1.83	4.70	1.30	4.17	0.58	-0.88	0.20	0.87	0.48	0.00	7.01	2.48	0.67	0.20	M	M
K2	9	8	6	15	8	8	1.80	4.47	1.53	4.20	0.62	-0.75	0.37	0.70	0.43	0.02	6.46	2.48	0.43	0.27	M	M
K3	1	28	5	2	1	23	1.67	4.73	1.27	4.33	0.68	-0.88	0.50	0.83	0.43	0.02	7.71	2.50	0.43	0.40	O	O
K4	2	6	3	4	2	14	1.67	4.70	1.30	4.33	0.68	-0.87	0.47	0.83	0.45	0.02	7.60	2.49	0.47	0.37	O	O
K5	18	26	27	24	18	12	1.67	3.97	2.03	4.33	0.73	-0.52	0.71	0.29	0.40	0.05	5.56	2.48	0.40	0.27	A	A
K6	29	2	14	25	29	18	2.20	4.03	1.97	3.80	0.50	-0.55	0.39	0.39	0.32	0.08	4.72	2.51	0.33	0.23	I	A
K7	5	26	19	2	5	3	1.63	4.47	1.53	4.37	0.73	-0.77	0.64	0.61	0.43	0.03	6.95	2.49	0.43	0.20	O	O
K8	11	17	13	4	11	30	1.77	4.27	1.73	4.23	0.65	-0.68	0.45	0.48	0.42	0.03	6.04	2.49	0.30	0.30	I	M
K9	28	8	10	20	27	29	2.10	4.10	1.90	3.90	0.52	-0.65	0.46	0.58	0.30	0.03	5.00	2.50	0.30	0.27	O	O
K10	19	19	12	15	20	13	1.90	4.17	1.83	4.10	0.60	-0.62	0.38	0.45	0.40	0.05	5.51	2.49	0.37	0.23	I	I
K11	25	22	21	15	25	5	1.93	4.07	1.93	4.07	0.60	-0.57	0.43	0.32	0.38	0.05	5.24	2.49	0.43	0.20	I	I
K12	17	15	15	12	16	27	1.93	4.23	1.77	4.07	0.62	-0.65	0.46	0.46	0.38	0.07	5.58	2.49	0.27	0.23	A	A
K13	12	17	11	15	12	19	1.77	4.23	1.77	4.23	0.65	-0.68	0.52	0.59	0.40	0.02	5.96	2.49	0.27	0.20	M	M
K14	20	21	4	20	19	15	1.87	4.13	1.87	4.13	0.60	-0.67	0.25	0.61	0.45	0.03	5.51	2.49	0.40	0.30	M	M
K15	3	2	2	1	3	16	1.77	4.77	1.23	4.23	0.67	-0.92	0.43	0.89	0.45	0.03	7.45	2.48	0.47	0.37	M	M
K16	8	11	9	8	8	20	1.80	4.47	1.53	4.20	0.67	-0.75	0.45	0.62	0.45	0.05	6.46	2.48	0.30	0.23	M	O
K17	6	7	8	8	6	10	1.80	4.60	1.40	4.20	0.67	-0.80	0.52	0.72	0.42	0.05	6.83	2.48	0.43	0.27	O	O
K18	7	23	16	4	7	17	1.70	4.43	1.57	4.30	0.70	-0.72	0.57	0.53	0.42	0.05	6.65	2.49	0.40	0.30	O	O
K19	30	5	23	20	30	6	2.20	4.00	2.00	3.80	0.50	-0.50	0.41	0.21	0.30	0.08	4.67	2.51	0.50	0.27	I	I
K20	15	13	22	12	15	22	1.87	4.23	1.77	4.13	0.63	-0.62	0.59	0.38	0.35	0.05	5.72	2.49	0.33	0.27	A	A
K21	27	8	20	15	28	7	2.13	4.13	1.87	3.87	0.53	-0.57	0.41	0.31	0.33	0.08	4.99	2.50	0.43	0.23	I	I
K22	24	23	25	25	24	25	1.83	4.00	2.00	4.17	0.63	-0.50	0.57	0.30	0.35	0.05	5.30	2.49	0.37	0.33	A	A
K23	26	25	24	29	26	24	1.80	3.90	2.10	4.20	0.62	-0.47	0.53	0.30	0.35	0.02	5.17	2.49	0.37	0.33	I	A
K24	16	30	30	30	17	9	1.50	3.83	2.17	4.50	0.77	-0.42	0.70	0.23	0.42	0.02	5.59	2.46	0.47	0.30	A	A
K25	23	28	28	25	23	4	1.63	3.87	2.13	4.37	0.72	-0.47	0.68	0.25	0.38	0.02	5.41	2.47	0.47	0.23	A	A
K26	22	12	29	28	22	2	1.57	3.83	2.17	4.43	0.77	-0.45	0.71	0.25	0.42	0.03	5.46	2.47	0.50	0.20	A	A
K27	21	19	18	8	21	28	2.00	4.27	1.73	4.00	0.60	-0.63	0.43	0.39	0.40	0.07	5.50	2.48	0.30	0.27	I	A
K28	14	13	17	12	13	26	1.90	4.33	1.67	4.10	0.62	-0.67	0.52	0.48	0.37	0.05	5.87	2.48	0.27	0.23	O	O
K29	13	4	7	8	14	11	1.97	4.40	1.60	4.03	0.55	-0.77	0.46	0.71	0.32	0.03	5.86	2.48	0.33	0.17	M	M
K30	10	16	26	20	10	21	1.57	4.10	1.90	4.43	0.77	-0.58	0.71	0.39	0.42	0.03	6.10	2.48	0.37	0.30	A	A

Table 5c: Customer Satisfaction: Case of Courier Service

CASE: COURIER SERVICE - CUSTOMER SATISFACTION

No	F vs. DF	SSI vs. DDI	CS vs. DS	RI	K	CAT	F	DF	DF'	F'	SSI	DDI	CS	DS	FI	DI	K	MAX-1	MAX-2	TRADITIONAL	FUZZY
K1	1	25	24	10	25	24	1.78	4.46	1.54	4.22	0.67	-0.74	0.59	0.63	0.384	0.054	6.50	2.48	0.43	0.22	O	O
K2	14	12	19	9	12	7	2.20	4.35	1.65	3.80	0.48	-0.69	0.32	0.50	0.322	0.062	5.24	2.47	0.36	0.30	I	I
K3	3	23	15	7	23	5	1.90	4.51	1.49	4.10	0.60	-0.77	0.43	0.67	0.384	0.047	6.30	2.48	0.36	0.32	M	O
K4	9	16	12	15	17	12	2.06	4.40	1.60	3.94	0.51	-0.72	0.33	0.60	0.351	0.033	5.64	2.47	0.36	0.30	M	M
K5	18	6	13	23	11	17	2.14	4.23	1.77	3.86	0.47	-0.64	0.24	0.50	0.348	0.029	5.15	2.49	0.43	0.31	I	I
K6	11	14	9	19	15	13	2.11	4.36	1.64	3.89	0.50	-0.69	0.25	0.56	0.373	0.047	5.44	2.48	0.41	0.33	M	M
K7	2	24	18	4	24	3	1.83	4.51	1.49	4.17	0.64	-0.77	0.46	0.66	0.413	0.043	6.47	2.48	0.33	0.30	M	M
K8	4	22	4	1	21	18	2.04	4.55	1.45	3.96	0.54	-0.79	0.35	0.68	0.366	0.047	6.02	2.47	0.41	0.26	M	M
K9	6	18	10	3	20	6	2.08	4.50	1.50	3.92	0.51	-0.77	0.34	0.63	0.348	0.043	5.80	2.47	0.34	0.30	M	M
K10	10	17	7	13	16	15	2.12	4.41	1.59	3.88	0.52	-0.73	0.30	0.62	0.377	0.069	5.52	2.47	0.38	0.30	M	M
K11	7	20	1	8	18	21	2.13	4.50	1.50	3.87	0.51	-0.78	0.30	0.69	0.37	0.065	5.68	2.46	0.42	0.26	M	M
K12	17	13	8	18	8	4	2.25	4.36	1.64	3.75	0.47	-0.72	0.31	0.62	0.319	0.076	5.14	2.47	0.35	0.31	M	M
K13	21	7	3	11	5	2	2.36	4.33	1.67	3.64	0.42	-0.70	0.21	0.54	0.315	0.083	4.89	2.47	0.39	0.38	I	M
K14	25	1	25	25	1	25	2.22	3.29	2.71	3.78	0.47	-0.39	0.27	0.30	0.326	0.072	3.74	2.61	0.44	0.14	I	R
K15	8	19	2	6	19	16	2.07	4.43	1.57	3.93	0.53	-0.75	0.32	0.66	0.366	0.062	5.68	2.47	0.38	0.28	M	M
K16	23	4	21	16	3	19	2.31	4.22	1.78	3.69	0.44	-0.63	0.28	0.43	0.308	0.083	4.81	2.49	0.43	0.28	I	I
K17	16	10	14	5	9	11	2.25	4.36	1.64	3.75	0.46	-0.70	0.27	0.52	0.33	0.062	5.16	2.47	0.38	0.32	I	I
K18	12	15	5	2	13	9	2.25	4.48	1.52	3.75	0.47	-0.76	0.28	0.61	0.33	0.08	5.35	2.46	0.38	0.32	M	M
K19	13	11	6	22	14	14	2.14	4.34	1.66	3.86	0.47	-0.68	0.25	0.57	0.348	0.04	5.35	2.48	0.41	0.33	M	M
K20	19	8	16	17	7	1	2.20	4.28	1.72	3.80	0.46	-0.67	0.28	0.51	0.322	0.051	5.11	2.48	0.36	0.34	M	M
K21	24	2	22	24	2	20	2.32	4.13	1.87	3.68	0.41	-0.59	0.28	0.42	0.275	0.069	4.67	2.50	0.43	0.28	I	I
K22	20	5	20	20	6	23	2.17	4.23	1.77	3.83	0.47	-0.63	0.28	0.45	0.33	0.054	5.08	2.49	0.46	0.25	I	I
K23	22	3	23	21	4	22	2.25	4.18	1.82	3.75	0.44	-0.60	0.28	0.39	0.297	0.065	4.85	2.49	0.46	0.26	I	I
K24	5	21	17	12	22	8	1.95	4.46	1.54	4.05	0.57	-0.73	0.39	0.60	0.37	0.04	6.03	2.48	0.33	0.28	M	M
K25	15	9	11	14	10	10	2.24	4.36	1.64	3.76	0.45	-0.69	0.25	0.53	0.326	0.069	5.17	2.47	0.41	0.35	M	M

Table 5d: Customer Satisfaction: Case of Bank Service

CASE: BANK- CUSTOMER SATISFACTION

No	F vs. DF	SSI vs. DDI	CS vs. DS	RI	K	CAT	F	DF	DF'	F'	SSI	DDI	CS	DS	FI	DI	K	MAX-1	MAX-2	TRADITIONAL	FUZZY
K1	10	6	6	8	6	14	1.73	3.57	2.43	4.27	0.64	-0.28	1.00	0.60	0.44	0.01	4.66	2.48	0.60	0.40	O	I
K2	11	5	5	7	5	9	1.82	3.55	2.45	4.18	0.60	-0.28	1.00	0.68	0.44	0.01	4.52	2.50	0.68	0.32	O	I
K3	9	7	11	3	7	12	1.50	3.55	2.45	4.50	0.76	-0.28	0.98	0.37	0.43	0.01	4.97	2.44	0.60	0.33	A	A
K4	8	8	9	3	8	12	1.50	3.55	2.45	4.50	0.76	-0.28	0.97	0.38	0.44	0.01	4.97	2.44	0.60	0.33	A	A
K5	15	1	1	6	1	1	2.20	3.53	2.47	3.80	0.42	-0.27	1.00	0.92	0.37	0.02	4.04	2.57	0.90	0.08	O	I
K6	14	2	3	1	2	5	2.02	3.45	2.55	3.98	0.51	-0.23	1.00	0.75	0.38	0.02	4.14	2.54	0.73	0.25	O	I
K7	7	9	7	9	9	15	1.53	3.68	2.32	4.47	0.73	-0.34	1.00	0.44	0.43	0.00	5.20	2.45	0.52	0.40	A	A
K8	13	3	2	2	3	4	1.97	3.45	2.55	4.03	0.55	-0.23	1.00	0.75	0.40	0.01	4.19	2.53	0.75	0.25	O	I
K9	12	4	4	5	4	8	1.92	3.50	2.50	4.08	0.55	-0.25	1.00	0.70	0.40	0.01	4.32	2.52	0.70	0.30	O	I
K10	5	12	8	14	12	11	1.37	4.00	2.00	4.63	0.83	-0.52	0.89	0.33	0.47	0.01	6.32	2.46	0.50	0.18	A	A
K11	2	14	10	15	15	10	1.33	4.05	1.95	4.67	0.85	-0.54	0.89	0.30	0.47	0.01	6.55	2.47	0.50	0.15	A	A
K12	3	13	12	12	13	6	1.25	3.93	2.07	4.75	0.89	-0.48	0.92	0.23	0.49	0.01	6.41	2.45	0.60	0.13	A	A
K13	4	11	15	13	11	2	1.18	3.85	2.15	4.82	0.92	-0.43	0.98	0.17	0.49	0.01	6.33	2.43	0.73	0.13	A	A
K14	6	10	14	11	10	3	1.22	3.73	2.27	4.78	0.90	-0.38	0.98	0.20	0.49	0.01	5.92	2.42	0.75	0.17	A	A
K15	1	15	13	10	14	7	1.22	3.95	2.05	4.78	0.91	-0.48	0.95	0.21	0.49	0.01	6.55	2.45	0.55	0.13	A	A

Table 5e: Customer Satisfaction: Case of Hotel

CASE: HOTEL - CUSTOMER SATISFACTION

No	F vs. DF	SSI vs. DDI	CS vs. DS	RI	K	CAT	F	DF	DF'	F'	SSI	DDI	CS	DS	FI	DI	K	MAX-1	MAX-2	TRADITIONAL	FUZZY
K1	11	18	20	1	11	1	1.87	3.70	2.30	4.13	0.04	-0.04	0.31	0.31	0.03	0.39	4.69	2.50	0.39	0.28	I	I
K2	20	16	14	2	19	19	2.15	3.83	2.17	3.85	0.05	-0.03	0.20	0.26	0.05	0.38	4.49	2.53	0.61	0.19	I	I
K3	9	11	8	3	9	8	2.13	4.01	1.99	3.87	0.04	-0.03	0.21	0.32	0.03	0.37	4.80	2.51	0.54	0.24	I	I
K4	2	4	4	17	2	3	2.10	4.09	1.91	3.90	0.05	-0.01	0.21	0.36	0.04	0.40	4.98	2.50	0.51	0.28	I	I
K5	8	6	11	19	8	11	2.17	4.06	1.94	3.83	0.05	-0.01	0.24	0.33	0.04	0.34	4.81	2.50	0.52	0.22	I	I
K6	13	10	18	4	13	20	2.12	3.90	2.10	3.88	0.04	-0.03	0.22	0.22	0.04	0.38	4.65	2.52	0.61	0.17	I	I
K7	4	7	16	18	4	12	2.08	4.03	1.97	3.92	0.04	-0.02	0.24	0.28	0.04	0.39	4.92	2.50	0.54	0.20	I	I
K8	1	15	2	8	1	6	2.13	4.14	1.86	3.87	0.06	-0.02	0.22	0.37	0.05	0.38	5.00	2.50	0.52	0.26	I	I
K9	16	17	12	13	16	10	2.22	3.98	2.02	3.78	0.07	-0.01	0.25	0.32	0.07	0.33	4.60	2.52	0.52	0.22	I	I
K10	5	5	3	9	5	17	2.19	4.12	1.88	3.81	0.04	-0.02	0.17	0.33	0.04	0.36	4.87	2.50	0.60	0.22	I	I
K11	14	1	10	10	14	16	2.21	4.00	2.00	3.79	0.04	-0.02	0.19	0.28	0.03	0.34	4.64	2.51	0.59	0.21	I	I
K12	15	9	17	14	15	14	2.20	3.97	2.03	3.80	0.06	-0.02	0.22	0.27	0.05	0.34	4.63	2.52	0.57	0.20	I	I
K13	17	20	19	7	17	18	2.18	3.91	2.09	3.82	0.07	-0.03	0.26	0.24	0.06	0.35	4.57	2.52	0.57	0.17	I	I
K14	18	3	7	15	18	15	2.26	3.97	2.03	3.74	0.04	-0.01	0.17	0.24	0.04	0.33	4.53	2.52	0.60	0.23	I	I
K15	12	13	6	12	12	9	2.20	4.01	1.99	3.80	0.06	-0.02	0.21	0.33	0.04	0.36	4.68	2.51	0.54	0.23	I	I
K16	10	19	5	5	10	7	2.19	4.03	1.97	3.81	0.06	-0.03	0.21	0.34	0.04	0.37	4.73	2.51	0.52	0.25	I	I
K17	19	14	13	11	20	13	2.28	3.96	2.04	3.72	0.05	-0.02	0.20	0.27	0.05	0.31	4.49	2.52	0.57	0.21	I	I
K18	3	2	15	20	3	5	2.08	4.05	1.95	3.92	0.05	-0.01	0.28	0.33	0.04	0.37	4.94	2.50	0.48	0.23	I	I
K19	6	12	9	6	6	2	2.10	4.02	1.98	3.90	0.05	-0.03	0.27	0.37	0.04	0.37	4.86	2.50	0.44	0.28	I	I
K20	7	8	1	16	7	4	2.26	4.17	1.83	3.74	0.06	-0.01	0.19	0.37	0.05	0.33	4.82	2.49	0.52	0.28	I	I

Table 6a: Customer Satisfaction: Case of Hotel Employee's Satisfaction

HOTEL EMPLOYEES SATISFACTION - TRIAL CASE

No	RANK						X AND Y axis FOR GRAPH											CAT		KANO	
	F vs. DF	SSI vs. DDI	CS vs. DS	RI	K	CAT	F	DF	DF'	F'	SSI	DDI	CS	DS	FI	DI	K	MAX-1	MAX-2	TRADITIONAL	FUZZY
K1	14	14	1	26	17	19	1.49	3.38	2.62	4.51	1.52	-0.39	0.71	0.31	0.44	0.03	4.65	2.43	0.43	A	A
K2	8	8	9	14	8	16	1.87	3.87	2.13	4.13	1.14	-0.88	0.42	0.36	0.39	0.03	4.99	2.50	0.41	I	I
K3	16	16	20	7	15	21	2.15	3.93	2.07	3.85	0.86	-0.94	0.20	0.33	0.38	0.05	4.65	2.52	0.53	I	I
K4	25	25	22	24	25	5	2.14	3.58	2.42	3.86	0.87	-0.59	0.21	0.37	0.37	0.03	4.17	2.55	0.40	I	I
K5	26	26	12	11	26	26	2.33	3.72	2.28	3.67	0.68	-0.73	0.22	0.20	0.28	0.05	4.11	2.57	0.63	I	I
K6	22	22	24	22	22	18	2.21	3.77	2.23	3.79	0.80	-0.78	0.16	0.33	0.35	0.04	4.32	2.54	0.51	I	I
K7	7	7	8	9	7	9	1.87	3.89	2.11	4.13	1.14	-0.90	0.43	0.34	0.39	0.03	5.03	2.50	0.39	I	I
K8	23	23	21	15	23	13	2.33	3.87	2.13	3.67	0.68	-0.88	0.22	0.36	0.28	0.05	4.30	2.54	0.47	I	I
K9	18	18	23	8	18	23	2.21	3.93	2.07	3.79	0.80	-0.94	0.16	0.33	0.35	0.04	4.55	2.52	0.57	I	I
K10	24	24	25	23	24	12	2.11	3.58	2.42	3.89	0.90	-0.59	0.20	0.38	0.39	0.05	4.21	2.55	0.43	I	I
K11	20	20	16	12	19	24	2.18	3.83	2.17	3.82	0.83	-0.84	0.24	0.27	0.35	0.05	4.45	2.53	0.53	I	I
K12	**2**	**2**	**4**	**1**	**2**	**2**	**1.49**	**4.07**	**1.93**	**4.51**	**1.52**	**-1.08**	**0.69**	**0.51**	**0.44**	**0.03**	**6.21**	**2.47**	**0.34**	**O**	**O**
K13	12	12	18	16	12	15	1.95	3.87	2.13	4.05	1.06	-0.88	0.27	0.36	0.42	0.03	4.87	2.50	0.45	I	I
K14	10	10	17	10	10	10	1.95	3.93	2.07	4.05	1.06	-0.94	0.27	0.33	0.42	0.03	4.97	2.50	0.45	I	I
K15	19	19	15	25	20	11	1.93	3.58	2.42	4.07	1.08	-0.59	0.34	0.37	0.39	0.03	4.43	2.51	0.37	I	I
K16	5	5	10	17	5	8	1.85	3.90	2.10	4.15	1.16	-0.91	0.44	0.39	0.39	0.03	5.08	2.49	0.37	I	I
K17	6	6	13	3	6	14	2.01	4.04	1.96	3.99	1.00	-1.05	0.39	0.38	0.36	0.05	5.05	2.50	0.39	I	I
K18	17	17	11	21	16	25	1.95	3.71	2.29	4.05	1.06	-0.72	0.26	0.22	0.42	0.03	4.60	2.51	0.57	I	I
K19	13	13	14	18	13	22	1.95	3.87	2.13	4.05	1.06	-0.88	0.26	0.29	0.42	0.03	4.86	2.50	0.52	I	I
K20	**1**	**1**	**5**	**2**	**1**	**3**	**1.49**	**4.12**	**1.88**	**4.51**	**1.52**	**-1.13**	**0.67**	**0.55**	**0.44**	**0.03**	**6.34**	**2.48**	**0.33**	**O**	**O**
K21	4	4	26	5	4	4	1.95	4.00	2.00	4.05	1.06	-1.01	0.25	0.43	0.42	0.03	5.09	2.50	0.41	I	I
K22	9	9	3	13	9	1	1.91	3.91	2.09	4.09	1.10	-0.92	0.45	0.27	0.37	0.04	4.98	2.50	0.37	A	I
K23	21	21	7	20	21	20	2.11	3.71	2.29	3.89	0.90	-0.72	0.32	0.22	0.35	0.05	4.38	2.53	0.50	I	I
K24	15	15	6	19	14	6	2.00	3.87	2.13	4.00	1.01	-0.88	0.40	0.28	0.36	0.05	4.77	2.51	0.41	I	I
K25	3	3	2	4	3	7	1.49	3.98	2.02	4.51	1.52	-0.99	0.69	0.40	0.44	0.03	5.96	2.47	0.40	A	A
K26	11	11	19	6	11	17	1.95	3.88	2.12	4.05	1.06	-0.89	0.24	0.34	0.42	0.03	4.88	2.50	0.47	I	I

(MAX-1 / MAX-2 values for Table 6a: K1 0.43/0.19; K2 0.41/0.21; K3 0.53/0.27; K4 0.40/0.29; K5 0.63/0.13; K6 0.51/0.27; K7 0.39/0.23; K8 0.47/0.29; K9 0.57/0.25; K10 0.43/0.26; K11 0.53/0.19; K12 0.34/0.31; K13 0.45/0.25; K14 0.45/0.28; K15 0.37/0.21; K16 0.37/0.21; K17 0.39/0.21; K18 0.57/0.19; K19 0.52/0.21; K20 0.33/0.30; K21 0.41/0.31; K22 0.37/0.35; K23 0.50/0.25; K24 0.41/0.28; K25 0.40/0.26; K26 0.47/0.25)

Table 6b: Customer Satisfaction: Case of Courier Service

POS SERVICE - TRIAL CASE

No	RANK						X AND Y axis FOR GRAPH											CAT		KANO	
	F vs DF	SSI vs. DDI	CS vs. DS	RI	K	CAT	F	DF	DF'	F'	SSI	DDI	CS	DS	FI	DI	K	MAX-1	MAX-2	TRADITIONAL	FUZZY
K1	6	17	4	16	6	24	1.64	4.27	1.73	4.36	0.67	-0.74	0.38	0.64	0.38	0.49	6.35	2.49	0.42	O	O
K2	15	11	18	18	15	12	1.89	4.01	1.99	4.11	0.48	-0.69	0.43	0.47	0.32	0.49	5.21	2.49	0.29	I	I
K3	**18**	**19**	**14**	**14**	**18**	**16**	**2.44**	**4.36**	**1.64**	**3.56**	**0.60**	**-0.77**	**0.50**	**0.62**	**0.38**	**0.48**	**4.77**	**2.47**	**0.38**	**M**	**M**
K4	12	15	19	13	12	15	1.94	4.21	1.79	4.06	0.51	-0.72	0.44	0.47	0.35	0.46	5.51	2.49	0.32	I	M
K5	14	5	15	15	14	11	2.10	4.24	1.76	3.90	0.47	-0.64	0.45	0.50	0.35	0.42	5.24	2.49	0.38	I	I
K6	**8**	**12**	**8**	**6**	**8**	**7**	**1.79**	**4.37**	**1.63**	**4.21**	**0.50**	**-0.69**	**0.46**	**0.63**	**0.37**	**0.46**	**6.24**	**2.48**	**0.32**	**M**	**M**
K7	24	24	22	25	24	23	2.61	3.46	2.54	3.39	0.64	-0.77	0.37	0.36	0.41	0.49	3.56	2.68	0.42	I	M
K8	**9**	**1**	**7**	**7**	**9**	**10**	**1.84**	**4.39**	**1.61**	**4.16**	**0.54**	**-0.79**	**0.43**	**0.63**	**0.37**	**0.50**	**6.15**	**2.48**	**0.34**	**M**	**M**
K9	**7**	**4**	**11**	**5**	**7**	**20**	**1.82**	**4.44**	**1.56**	**4.18**	**0.51**	**-0.77**	**0.55**	**0.71**	**0.35**	**0.50**	**6.32**	**2.48**	**0.41**	**M**	**M**
K10	21	20	25	22	21	19	2.31	3.62	2.38	3.69	0.52	-0.73	0.44	0.39	0.38	0.49	4.03	2.58	0.37	I	M
K11	16	13	9	20	16	5	1.88	3.88	2.12	4.12	0.51	-0.78	0.41	0.56	0.37	0.50	5.00	2.50	0.26	O	M
K12	22	25	16	19	22	2	2.61	3.91	2.09	3.39	0.47	-0.72	0.47	0.52	0.32	0.49	3.98	2.56	0.26	I	M
K13	25	22	23	23	25	17	2.67	3.51	2.49	3.33	0.42	-0.70	0.41	0.39	0.32	0.51	3.56	2.68	0.35	I	I
K14	23	21	21	24	23	21	2.26	3.44	2.56	3.74	0.47	-0.39	0.37	0.39	0.33	0.34	3.87	2.60	0.34	I	I
K15	4	18	1	10	4	25	1.57	4.35	1.65	4.43	0.53	-0.75	0.35	0.66	0.37	0.50	6.78	2.49	0.48	O	M
K16	3	3	2	4	3	3	1.68	4.57	1.43	4.32	0.44	-0.63	0.44	0.73	0.31	0.50	7.10	2.49	0.37	O	I
K17	**1**	**2**	**3**	**1**	**1**	**4**	**1.76**	**4.68**	**1.32**	**4.24**	**0.46**	**-0.70**	**0.44**	**0.74**	**0.33**	**0.50**	**7.19**	**2.48**	**0.38**	**M**	**I**
K18	**2**	**8**	**5**	**2**	**2**	**8**	**1.74**	**4.64**	**1.36**	**4.26**	**0.47**	**-0.76**	**0.49**	**0.72**	**0.33**	**0.53**	**7.14**	**2.49**	**0.38**	**M**	**M**
K19	**5**	**6**	**6**	**3**	**5**	**9**	**1.80**	**4.53**	**1.47**	**4.20**	**0.47**	**-0.68**	**0.46**	**0.68**	**0.35**	**0.44**	**6.64**	**2.48**	**0.36**	**M**	**M**
K20	**10**	**10**	**12**	**9**	**10**	**1**	**1.99**	**4.37**	**1.63**	**4.01**	**0.46**	**-0.67**	**0.44**	**0.57**	**0.32**	**0.47**	**5.73**	**2.48**	**0.32**	**M**	**M**
K21	17	14	20	12	17	18	2.25	4.21	1.79	3.75	0.41	-0.59	0.42	0.45	0.28	0.45	4.90	2.49	0.42	I	I
K22	**13**	**9**	**13**	**11**	**13**	**13**	**2.09**	**4.33**	**1.67**	**3.91**	**0.47**	**-0.63**	**0.48**	**0.60**	**0.33**	**0.46**	**5.43**	**2.48**	**0.37**	**M**	**I**
K23	19	16	24	21	19	22	2.18	3.90	2.10	3.82	0.44	-0.60	0.43	0.38	0.30	0.47	4.55	2.52	0.41	I	I
K24	20	23	17	17	20	6	2.40	4.12	1.88	3.60	0.57	-0.73	0.46	0.50	0.37	0.47	4.52	2.51	0.34	I	M
K25	**11**	**7**	**10**	**8**	**11**	**14**	**1.96**	**4.33**	**1.67**	**4.04**	**0.45**	**-0.69**	**0.50**	**0.65**	**0.33**	**0.49**	**5.73**	**2.48**	**0.35**	**M**	**M**

(MAX-2 values for Table 6b: K1 0.18; K2 0.23; K3 0.27; K4 0.23; K5 0.33; K6 0.29; K7 0.20; K8 0.29; K9 0.27; K10 0.23; K11 0.23; K12 0.24; K13 0.22; K14 0.16; K15 0.18; K16 0.36; K17 0.36; K18 0.34; K19 0.31; K20 0.31; K21 0.29; K22 0.30; K23 0.23; K24 0.31; K25 0.26)

Table 7: Kano Manipulating Graph Simplification: Quadrant Focused

CUSTOMER SATISFACTION : EVENT ORGANIZER CASE

Check with Level: *K2*, **K15**, K16

	F vs DF GRAPH-1	DF' vs F' GRAPH-2	SSI vd DDI GRAPH-3	CS vs DS GRAPH-4	K GRAPH-5	CAT GRAPH-6	FI vs. DI GRAPH-7	Check with Level
QUADRAN-1	K13	K1, K29	K1, K2, K14, K29		K14, K29	K13, K16, K29		K16
QUADRAN-2	**K2, K15, K16**	**K2, K15, K16**		K1, K2, K14, K15, K16, K29			K29	
QUADRAN-3	K1 , K29	K13		K13		K14, K15	**K1, K15, K16**	
QUADRAN-4	K14	**K14**	**K13, K15, K16**		K1, K2, K13, K15, K16	K1, K2	K2, K13, K14	
	K2, K15, K16	**K2, K15, K16** , K14	K13, **K15, K16**	K1, **K2**, K14, **K15, K16**, K29 ,13	K1, K2, K13, **K15, K16**	K1, **K2**	K1, **K15, K16**	

CUSTOMER SATISFACTION : COURIER SERVICE CASE

Check with Level: K3 K9 / K4 K10 / **K7** *K11* / **K8** K15 / K24

	F vs DF GRAPH-1	DF' vs F' GRAPH-2	SSI vd DDI GRAPH-3	CS vs DS GRAPH-4	K GRAPH-5	CAT GRAPH-6	FI vs. DI GRAPH-7
QUADRAN-1		K12, K18, K19, K25	K6, K12, K18	K6, K20, K25	K12, K18, K19, K20, K15, K24		**K20**
QUADRAN-2	**K3, K4, K6, K7, K8, K9, K10, K15**	**K3, K4, K6, K7, K8, K9, K10,**		K10, K11, K18, K19		K3, K4, K7, K9, K10, K12, K18	K12, K18, K25
QUADRAN-3	K11, K12, K18, K19, K25			K3, K4, K7, K8, K9, K12, K15, K24		K6, K19, K25	**K7, K8, K10, K9, K11**
QUADRAN-4	K20	**K20**	K3, K4, K7, K8, K9, K10 ,K11, K15,		K3, K4, K6, K7, K8, K9, K10, K11, K15,	**K8, K11**	K3, K4, K6, K19
	K3, K4, K6, K7, K8, K9, K10, K15	**K3, K4, K7, K6, K8, K9, K10,** K20	**K3, K4, K7, K8, K9, K10, K11, K15, K24,**	K10, K11, K18, K19, K12 , K3, K4, K7, K8, K9, K15, **K24**	**K3, K4, K6, K7, K8,** K9, K10, K11, K15, **K24**	**K8, K11**	K20, **K7, K8, K10, K9, K11**

CUSTOMER SATISFACTION : HOSPITAL SERVICE CASE

Check with Level: **K14**

	F vs DF GRAPH-1	DF' vs F' GRAPH-2	SSI vd DDI GRAPH-3	CS vs DS GRAPH-4	K GRAPH-5	CAT GRAPH-6	FI vs. DI GRAPH-7
QUADRAN-1							
QUADRAN-2	**K14**	**K14**				K14	
QUADRAN-3				K14			**K14**
QUADRAN-4			**K14**		**K14**		
	K14	**K14**	**K14**	**K14**	**K14**		**K14**

CUSTOMER SATISFACTION BANK SERVICE CASE

Check with Level: **K5**

	F vs DF GRAPH-1	DF' vs F' GRAPH-2	SSI vd DDI GRAPH-3	CS vs DS GRAPH-4	K GRAPH-5	CAT GRAPH-6	FI vs. DI GRAPH-7
QUADRAN-1							**K5, K6, K8, K9**
QUADRAN-2			K1, K2, K5, K6, K8, K10		K1, K2, K5, K6, K8, K12	K1	
QUADRAN-3				K1, K2, K5, K6, K8, K12		K2, K6, K8, K9	
QUADRAN-4	K1, K2, K5, K6, K8, K9	**K1, K2, K5, K6, K8, K10**				**K5**	K1, K2
		K1, K2, **K5**, K6, K8, K10		K1, K2, **K5**, K6, K8, K12		**K5**	**K5**, K6, K8, K9

CUSTOMER SATISFACTION : HOTEL SERVICE CASE

Check with Level: **K8**

	F vs DF GRAPH-1	DF' vs F' GRAPH-2	SSI vd DDI GRAPH-3	CS vs DS GRAPH-4	K GRAPH-5	CAT GRAPH-6	FI vs. DI GRAPH-7
QUADRAN-1		K10, K16, K20	K10				**K10, K20**
QUADRAN-2	**K4, K8,**	**K4, K8**	K4,	**K4, K8, K10, K16, K20**		K4, K8, K16, K20	K4, K16
QUADRAN-3	K10, K16, K20		K20				**K8**
QUADRAN-4		**K8, K16**			**K4, K8, K10, K16, K20**	**K10**	
	K4, **K8**	K4, **K8**	**K8**, K16	K4, **K8**, K10, K16, K20	K4, **K8**, K10, K16, K20	K10	K10, K20, **K8**

EMPLOYEES SATISFACTION : HOTEL SERVICE CASE

Check with Level: *K12* *K20*

	F vs DF GRAPH-1	DF' vs F' GRAPH-2	SSI vd DDI GRAPH-3	CS vs DS GRAPH-4	K GRAPH-5	CAT GRAPH-6	FI vs. DI GRAPH-7
QUADRAN-1							
QUADRAN-2	**K12, K20**	**K12 , K20**				K12, K20	
QUADRAN-3				**K12, K20**			**K12, K20**
QUADRAN-4			**K12, K20**		**K12, K20**		
	K12, K20	**K12, K20**	**K12, K20**	**K12, K20**	**K12, K20**		**K12, K20**

CUSTOMER SATISFACTION : POS SERVICE CASE

Check with Level: **K17** K9

	F vs DF GRAPH-1	DF' vs F' GRAPH-2	SSI vd DDI GRAPH-3	CS vs DS GRAPH-4	K GRAPH-5	CAT GRAPH-6	FI vs. DI GRAPH-7
QUADRAN-1		K3, K22	K3		K3	K25	**K20**
QUADRAN-2	**K6, K8, K9, K17, K18, K19, K20, K25**	**K6, K8, K9, K17, K18, K19, K20, K25**		**K8, K20**		K6, K8, K19, K20	K3, K22
QUADRAN-3	K3, K22			**K3, K6, K9, K17, K18, K19, K22, K25**		K3, K17, K18, K22	**K9, K17, K18, K19, K25**
QUADRAN-4			**K6, K8, K9, K17, K18, K19, K20, K25**		**K3, K6, K8, K9, K17, K18, K19, K20, K22, K25**	**K9**	K6, K8
	K6, K8, **K9, K17**, K18, K19, K20, K25	K6, K8, **K9, K17**, K18, K19, K20, K25	K6, K8, **K9, K17**, K18, K19, K20, K25	K8, K20, K3, K6, **K9, K17**, K18, K19, K22, K25	K3, K6, K8, **K9, K17**, K18, K19, K20, K22, K25	**K9**	K20, K6, K8, **K9, K17**, K18, K19, K25